ATTACHMENT F

Afternoon Breakout Results

August 2, 2004, ZENH Workshop

PV-ZENH Workshop: Output from afternoon break-out groups (business models)

Sacramento, CA
August 2, 2004

Note: These materials represent output from the 8/2/04 PV-ZENH workshop. Proposers to the 2004 PIER ZENH RFP may use these ideas to assist them in developing business models to incorporate into their RFP responses. However, this does not imply endorsement by the California Energy Commission of any particular models. Bidders are encouraged to develop other business model concepts independently.

PV-ZENH Workshop Afternoon Breakout: Business Model Development

Break-out group objective

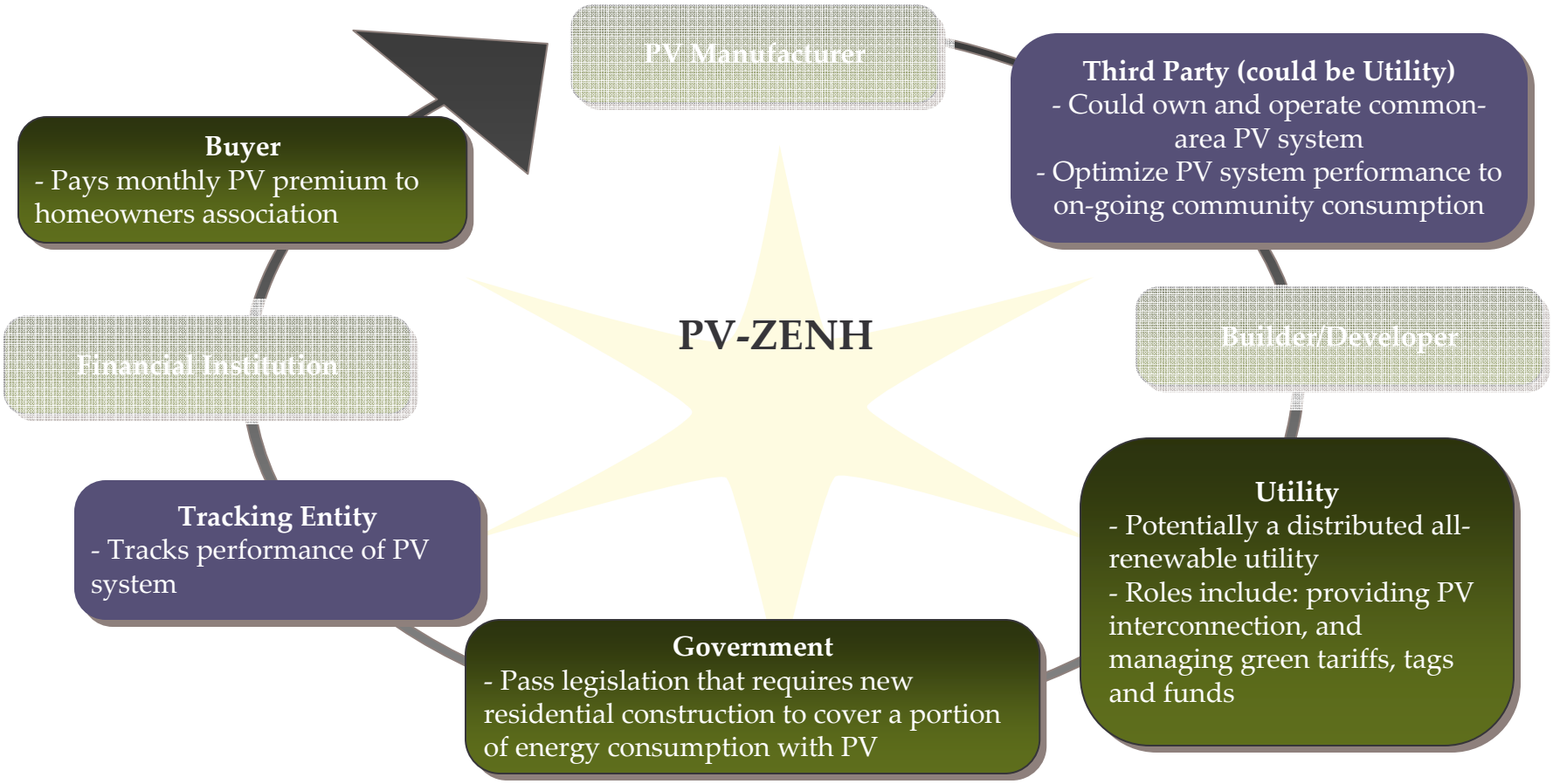
Unlike the morning session (where groups were formed by stakeholder), in the afternoon six groups were constructed to integrate stakeholders. Each group was instructed to assemble three to five business models and discuss the potential benefits of the new model (over the status quo).

Presentation of break-group results (disclaimer)

The following business models represent the output from the break-out groups. These models represent a best attempt at capturing the main ideas and concepts developed by each group. Every effort was taken to maintain the integrity of the models developed in the session. Therefore editing focused on obtaining clarity for a broader audience, while it did not add or alter content in an attempt to perfect or complete the models.

PV-ZENH Workshop Afternoon Breakout
Group: A Business Model # 1

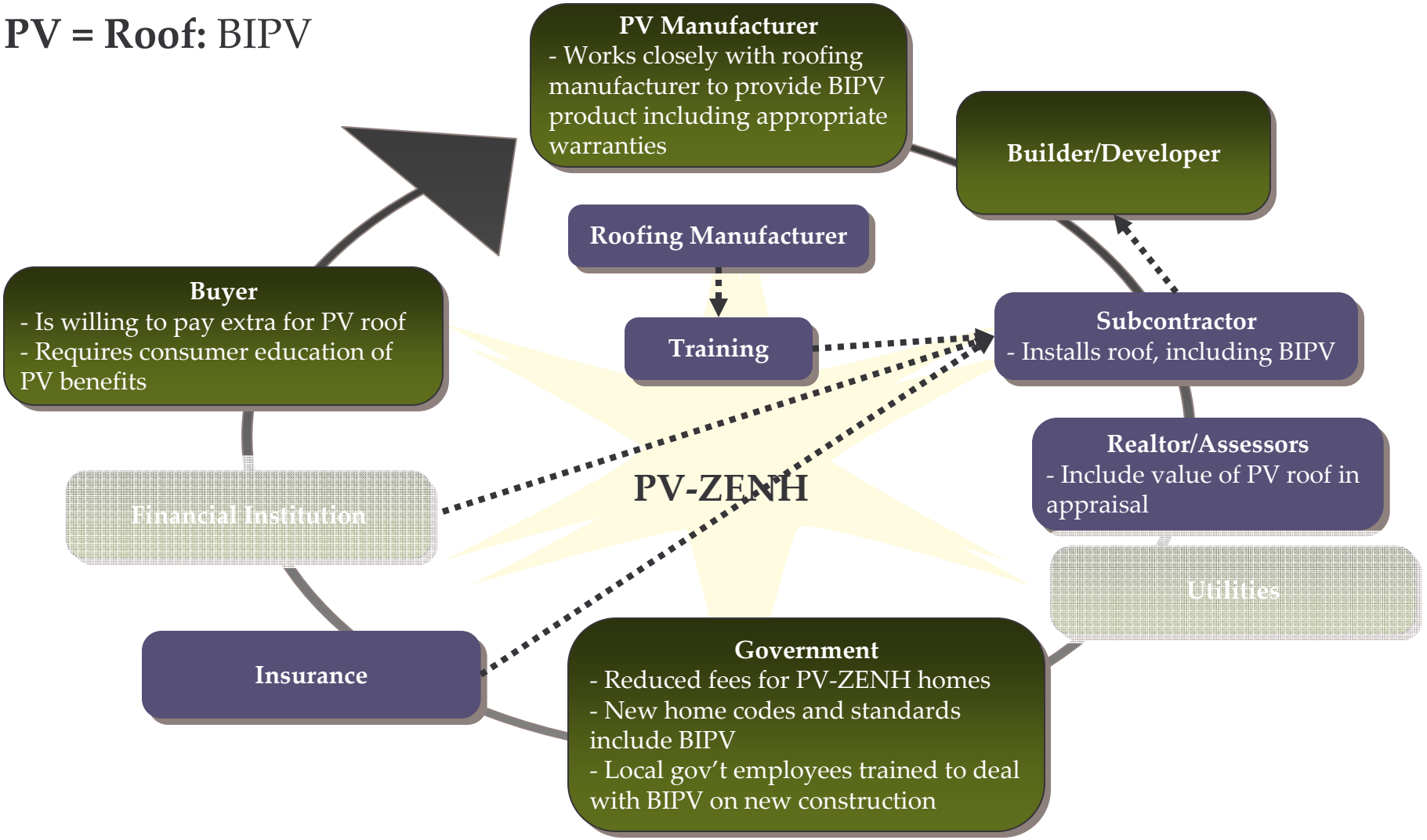
Off-Roof PV: Mitigate risks and challenges of PV-ZENH by locating PV panels in common off-roof spaces.



Note: Participants mentioned that PV interconnection with grid could be an issue.

PV-ZENH Workshop Afternoon Breakout
Group: A Business Model # 2

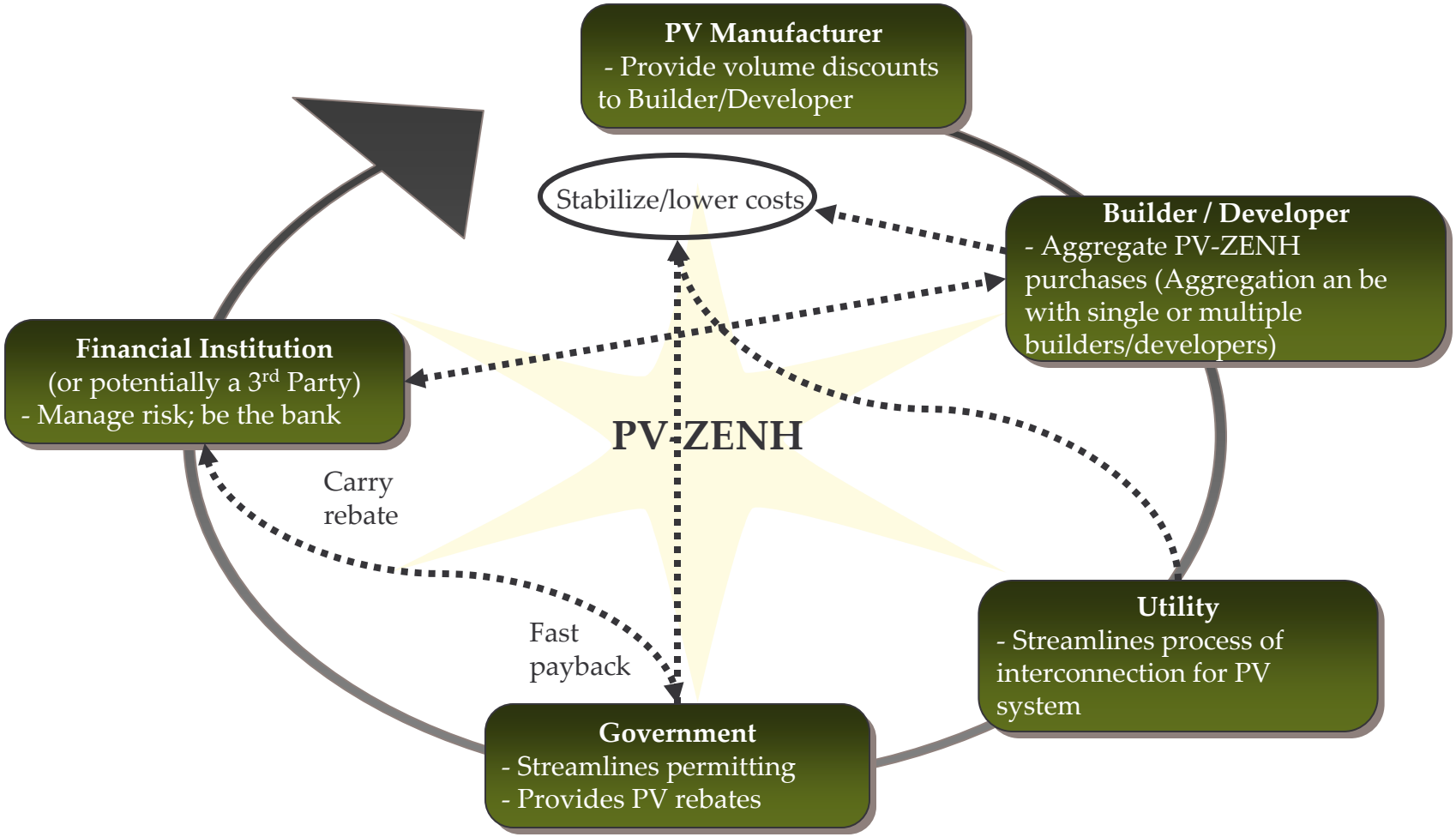
PV = Roof: BIPV



This model requires close partnering between PV manufacturers and roofing manufacturers to provide BIPV roofing materials with strong warranties. Need to train subcontractors/installers on BIPV installation. PV education is needed for appraisers and building inspectors.

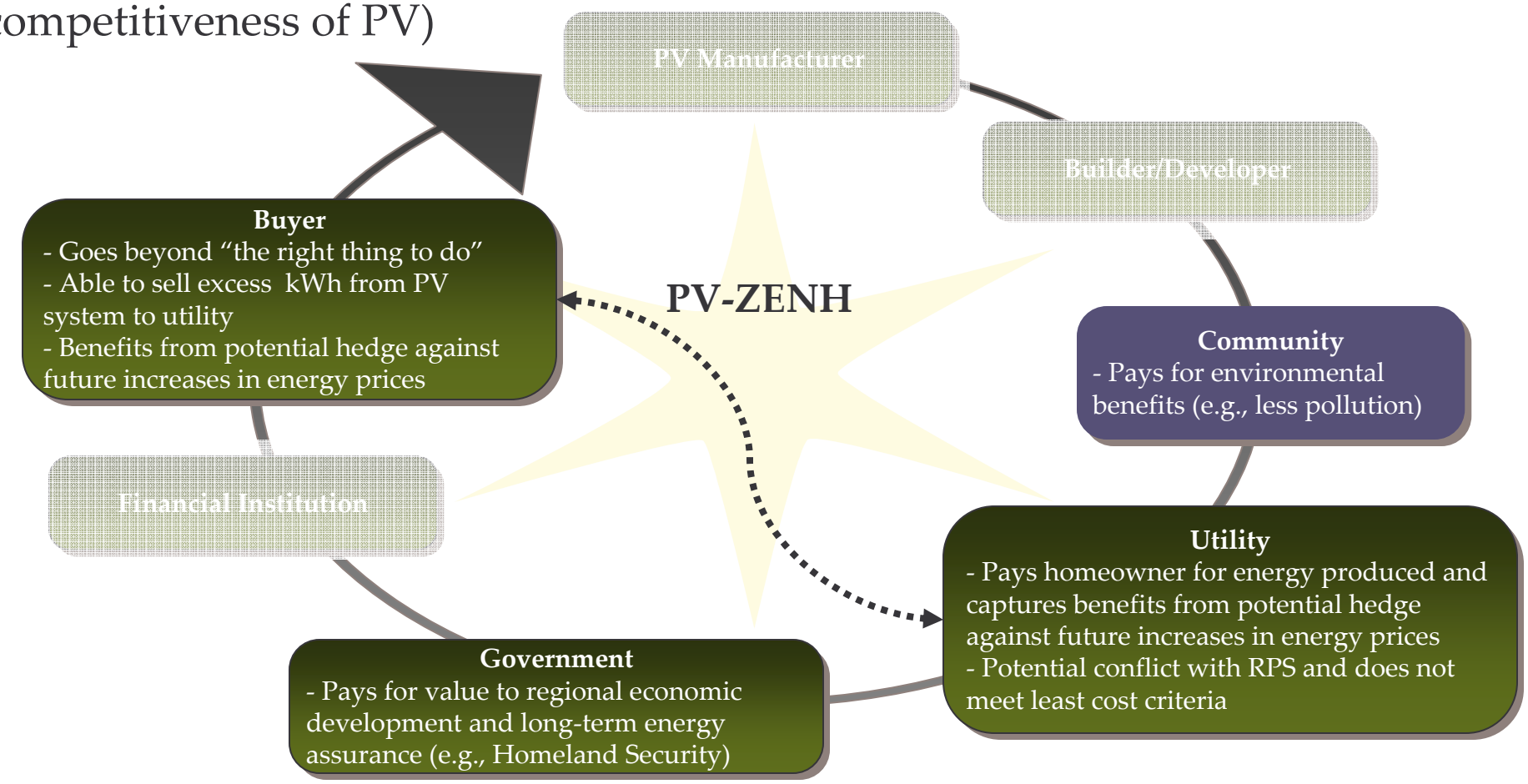
PV-ZENH Workshop Afternoon Breakout
Group: A Business Model # 3

Streamline Permitting and Aggregate PV-ZENH: Reduce costs and hassles by risk sharing and consolidation of transactions.



PV-ZENH Workshop Afternoon Breakout
Group: A Business Model # 4

PV Value Enhancement (the idealistic model): Society pays for the positive externalities associated with PV-ZENH (thus increasing cost competitiveness of PV)



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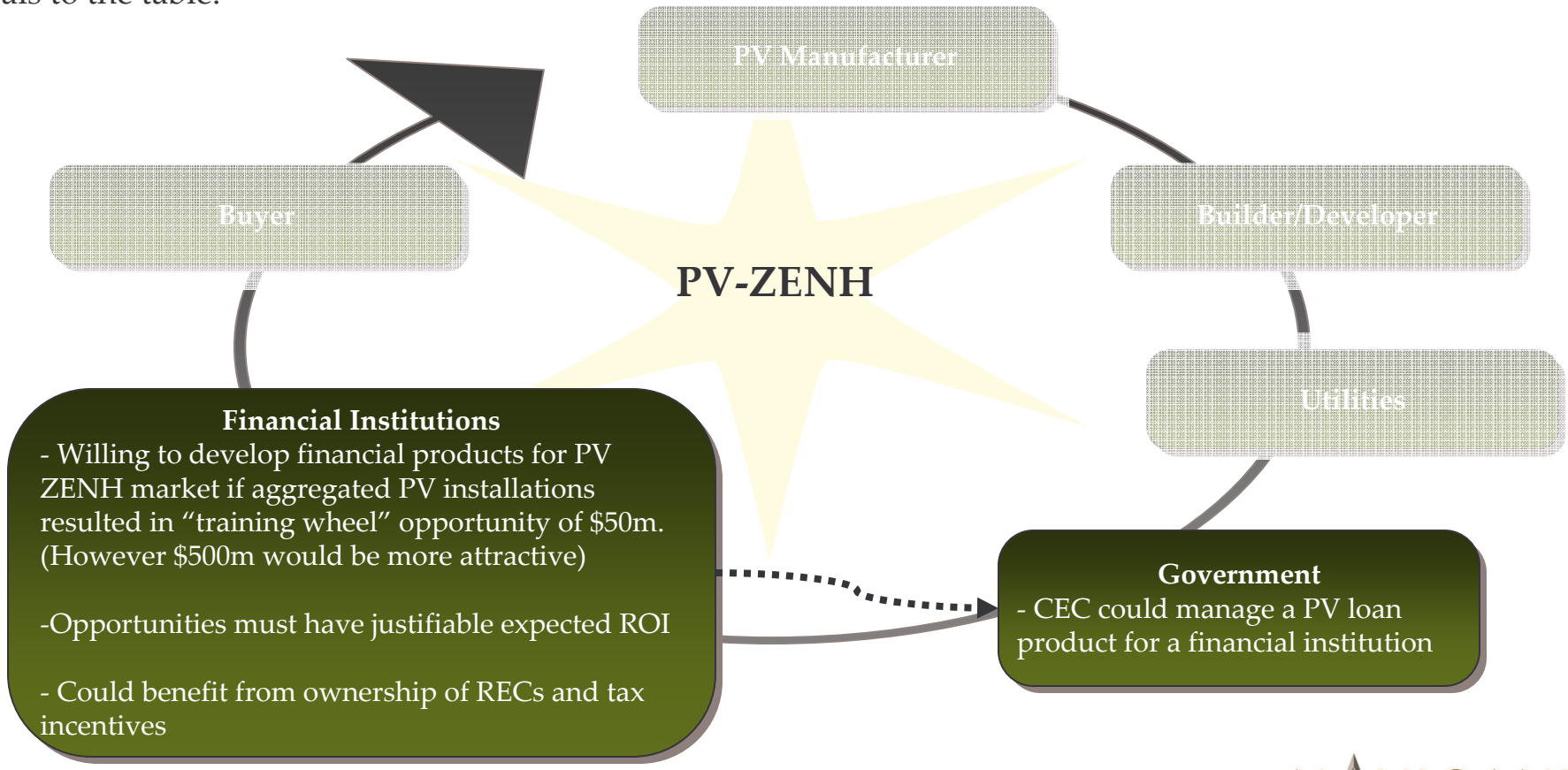
PV-ZENH Workshop Afternoon Breakout
Group: B Business Model #1

Aggregation is King (1 of 6)

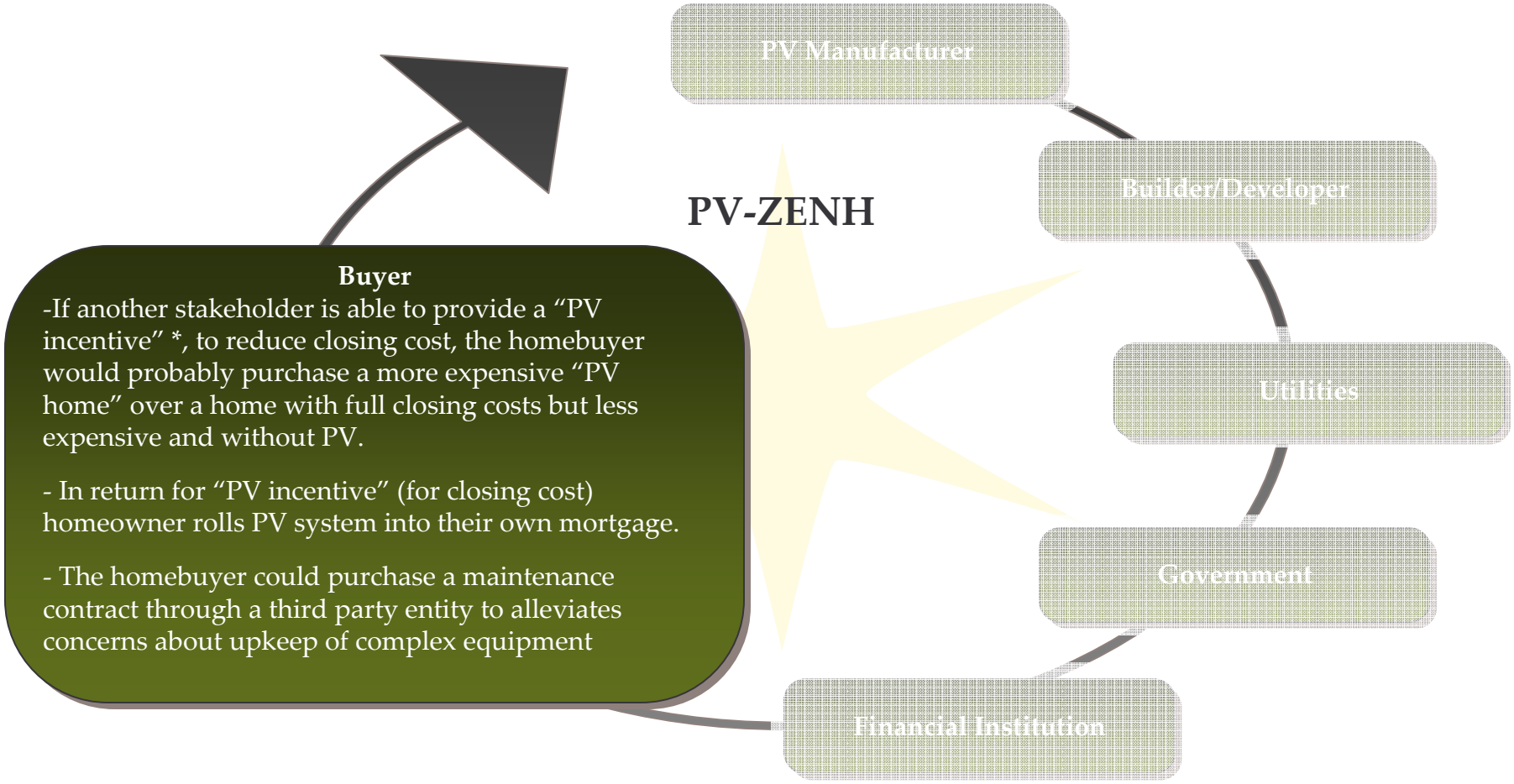
By aggregating demand for PV-ZENH, financial institutions are able to develop products specifically for residential PV. This afternoon break-out group started with the challenge (proposed by a member of the finance community) of aggregating $50m worth of residential PV investment. Each stakeholder, in turn, determined what they could do in order meet that challenge – that is, bring $50m worth of deals to the table.



PV-ZENH Workshop Afternoon Breakout
Group: B Business Model #1 (continue)

Aggregation is King (2 of 6)

Homebuyers are now attracted to PV homes…

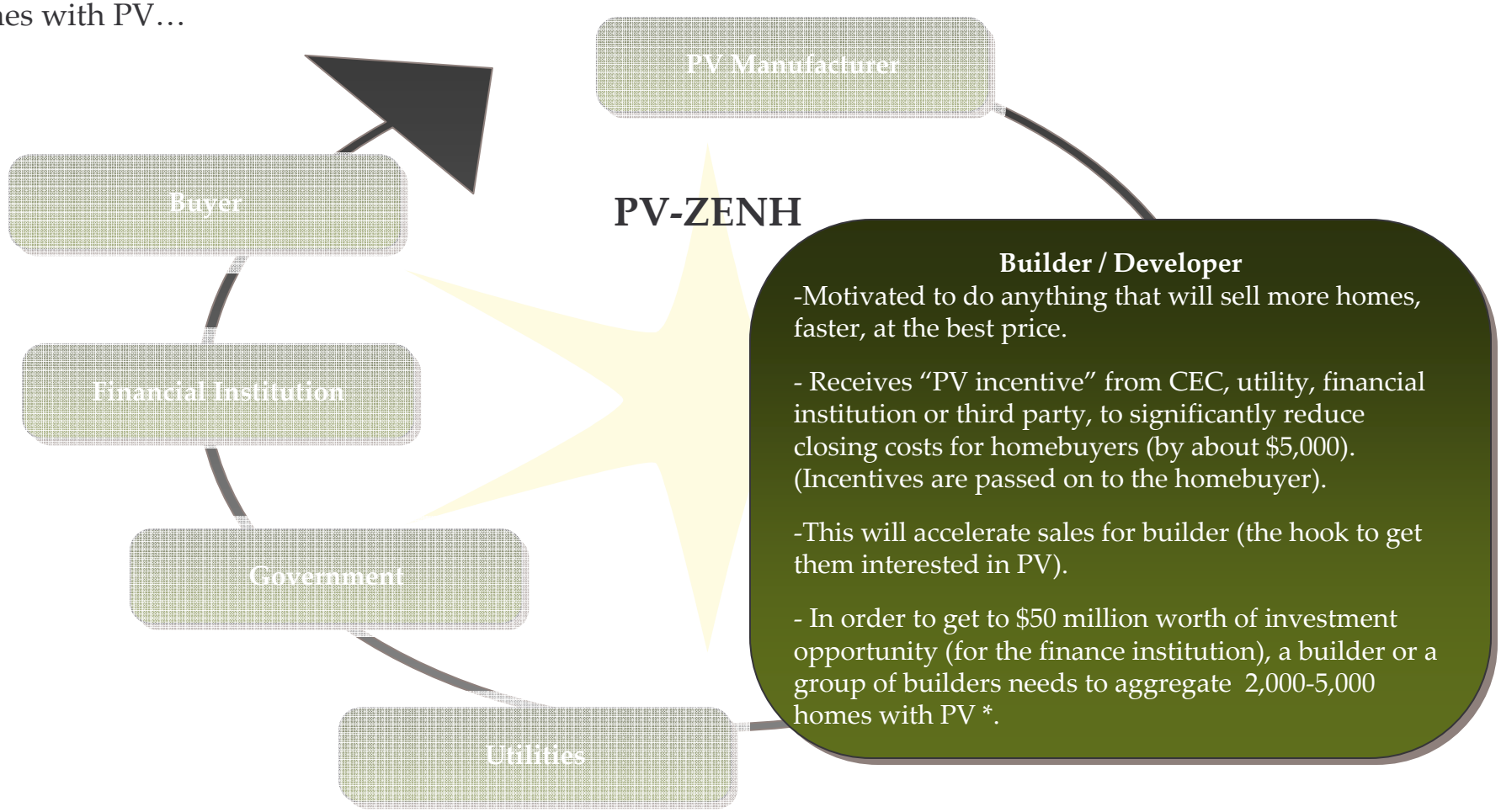


* The PV incentive for the homebuyer could come from CEC, utility, financial institution or third party, to significantly reduce closing costs (by about $5,000).

PV-ZENH Workshop Afternoon Breakout
Group: B Business Model #1 (continue)

Aggregation is King (part 3 of 6)

Builders are able to accelerate home sales because they can offer to pay a portion of closing costs for homes with PV…

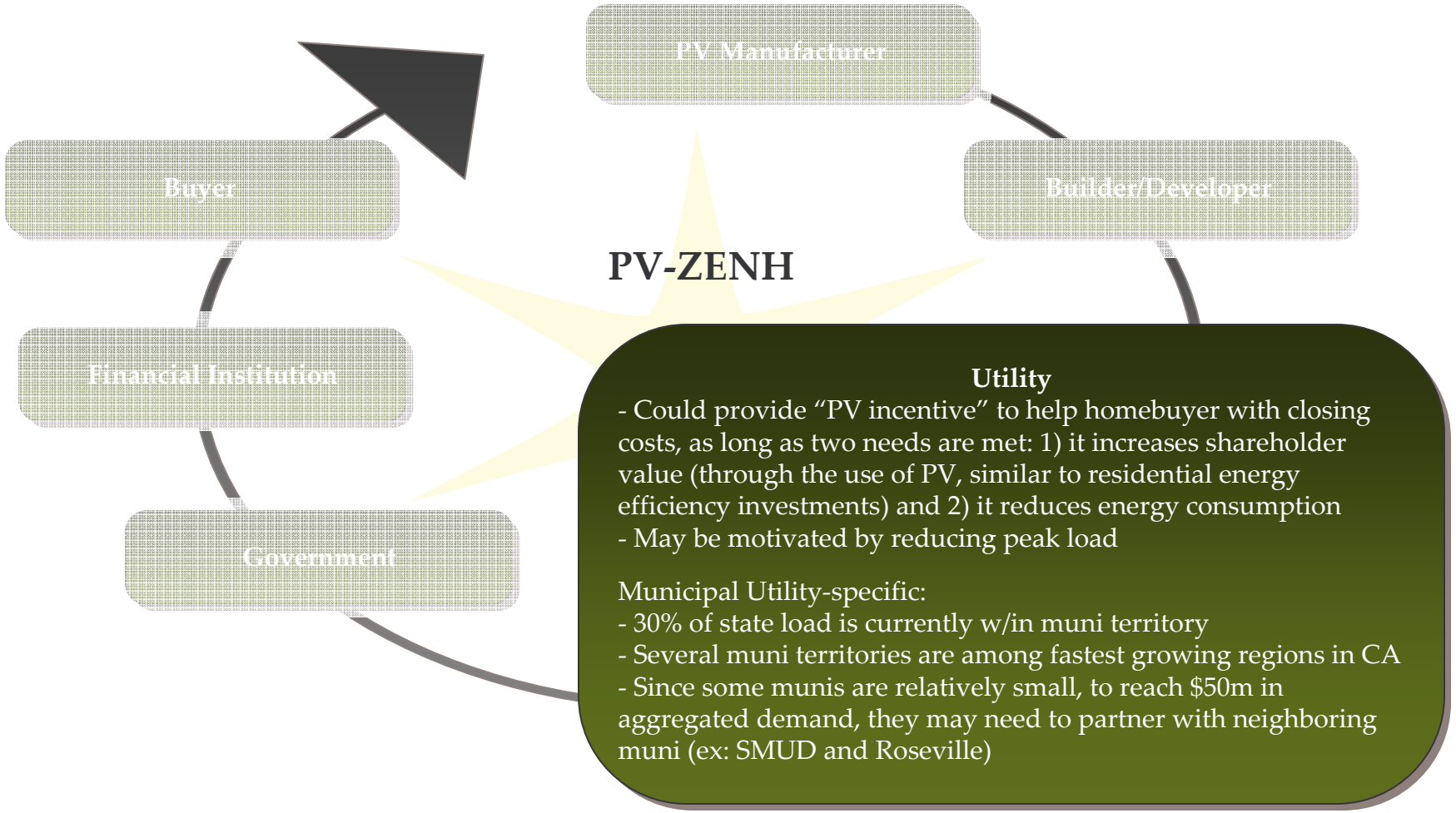


* The group performed a back-of-the-envelope calculation of the number of residential PV systems needed to hit the $50m target.

PV-ZENH Workshop Afternoon Breakout
Group: B Business Model # 1 (continue)

Aggregation is King (4 of 6)

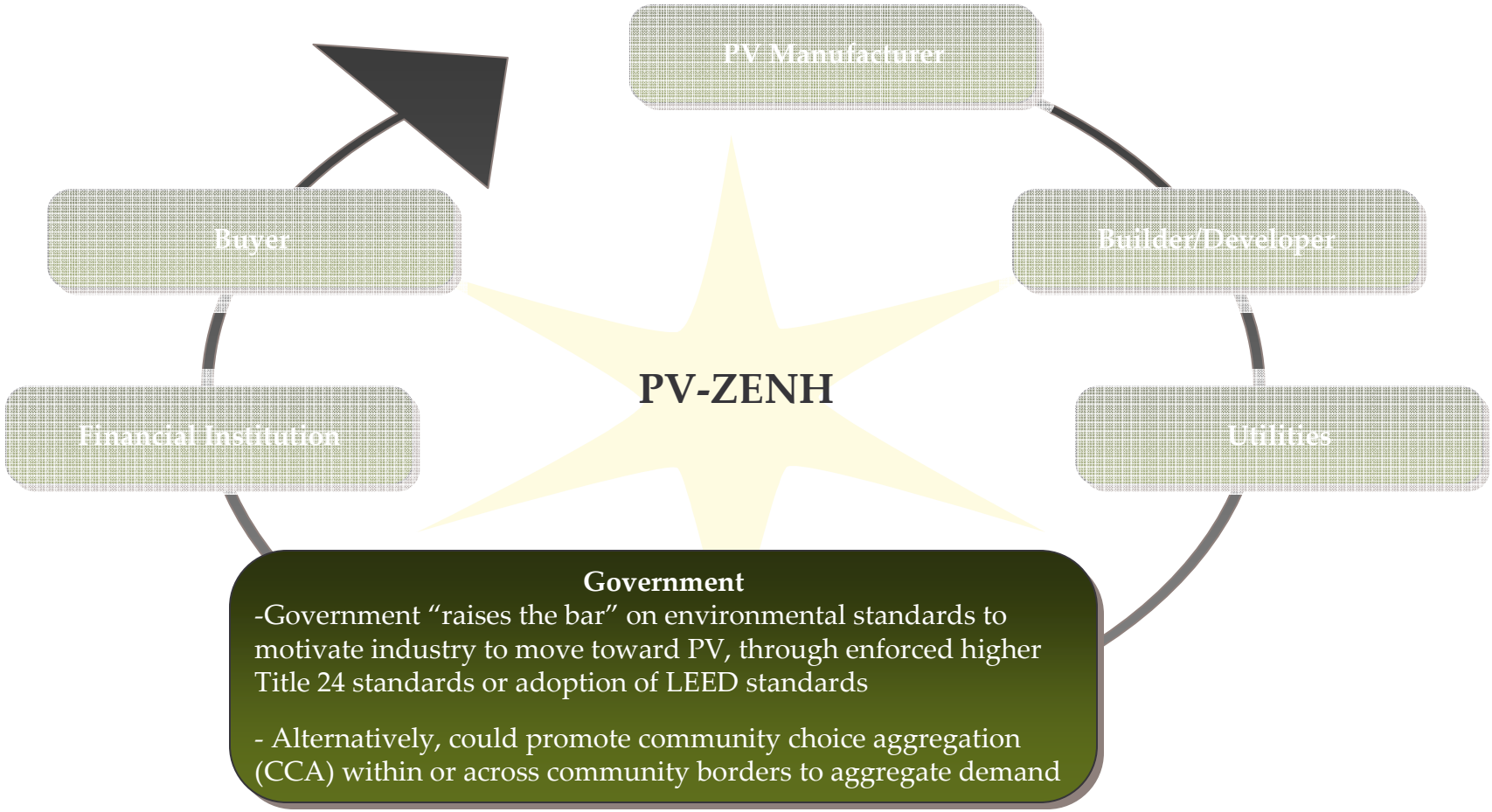
The utilities support the move toward aggregation and provide "PV incentives" to help cover closing costs …



PV-ZENH Workshop Afternoon Breakout
Group: B Business Model #1 (continue)

Aggregation is King (5 of 6)

The government raises the bar on renewables, creating substantial demand for PV…



Government

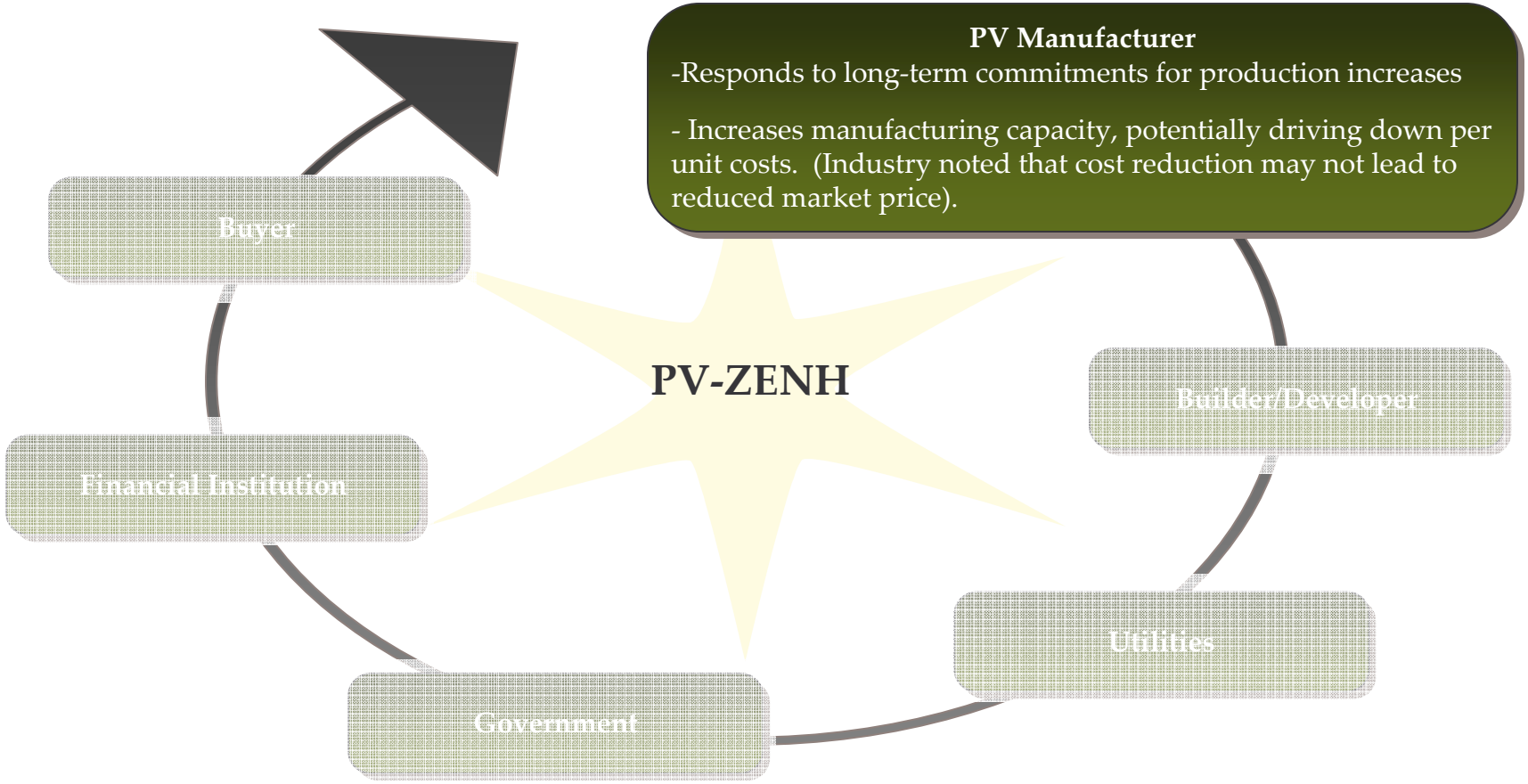
-Government "raises the bar" on environmental standards to motivate industry to move toward PV, through enforced higher Title 24 standards or adoption of LEED standards

- Alternatively, could promote community choice aggregation (CCA) within or across community borders to aggregate demand

PV-ZENH Workshop Afternoon Breakout
Group: B Business Model # 1 (continue)

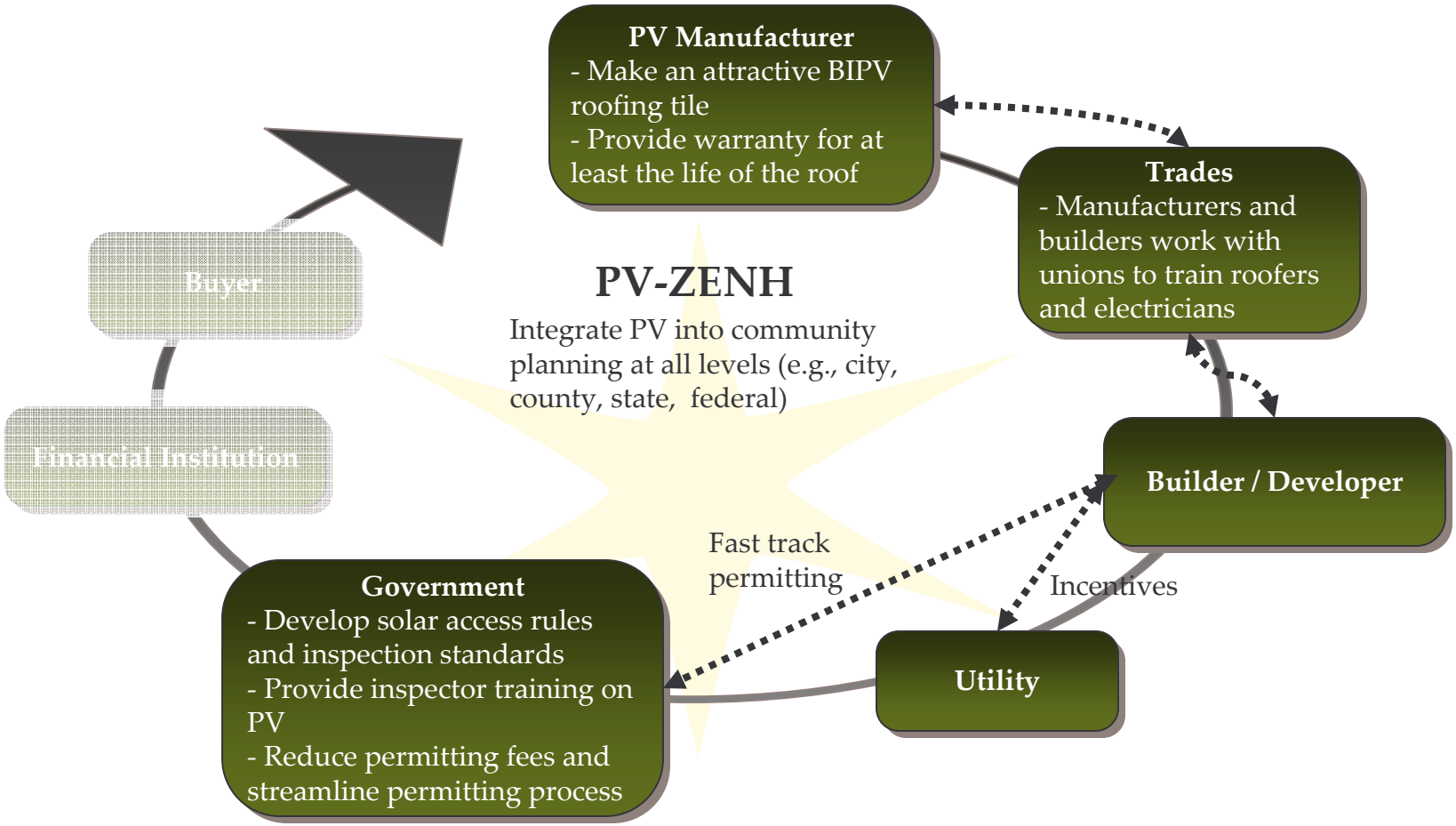
Aggregation is King (6 of 6)

Manufacturers respond with increased production scale…



ZENH Workshop Afternoon Breakout
Group: C Business Model # 1

Holistic BIPV Community Planning and Development



Holistic sustainable community planning integrates attractive BIPV roofs with strong warranties, making certain installations maximize the resource (solar) benefits. Government facilitates planning and partnering, and provides incentives to facilitate development.

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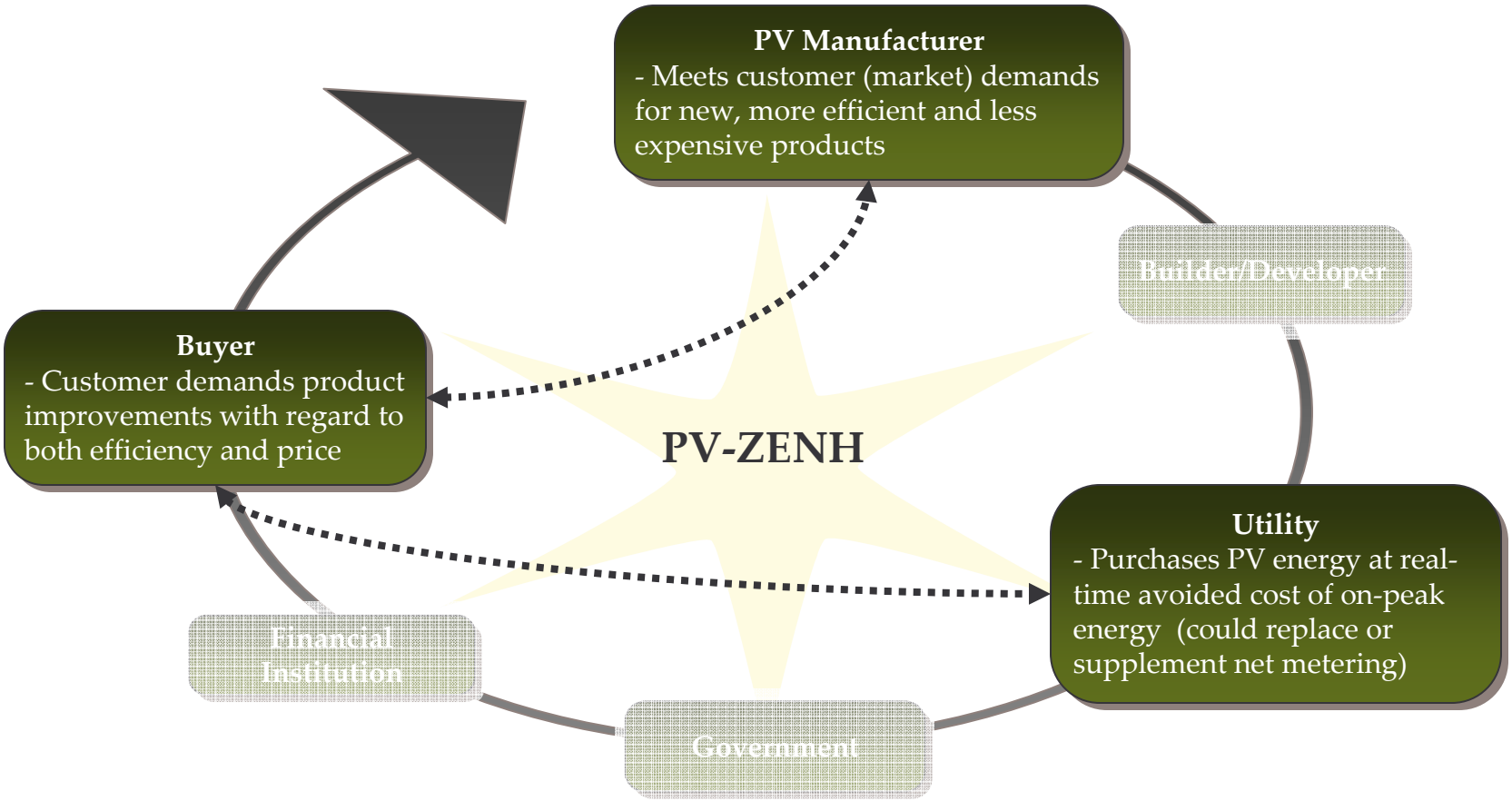
ZENH Workshop Afternoon Breakout
Group: C Business Model #2

Utility Buys PV Energy using Real-Time Pricing



PV-ZENH demand increases as home buyers earn attractive revenues through sales of on-peak PV production to utilities (assumes that on-peak price of power would be comparable to, or greater than, the value of net metering).

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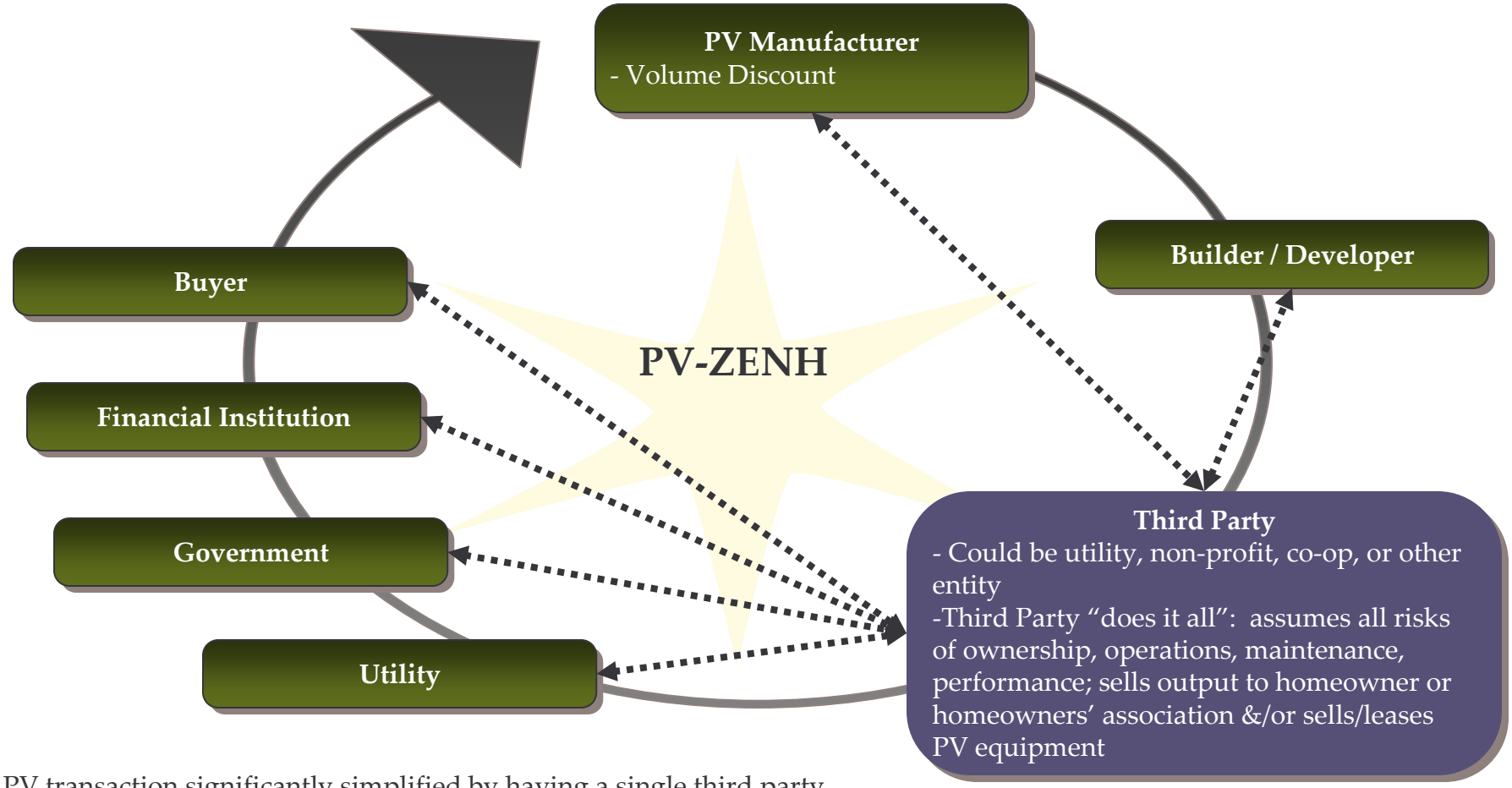
ZENH Workshop Afternoon Breakout
Group: C Business Model #3

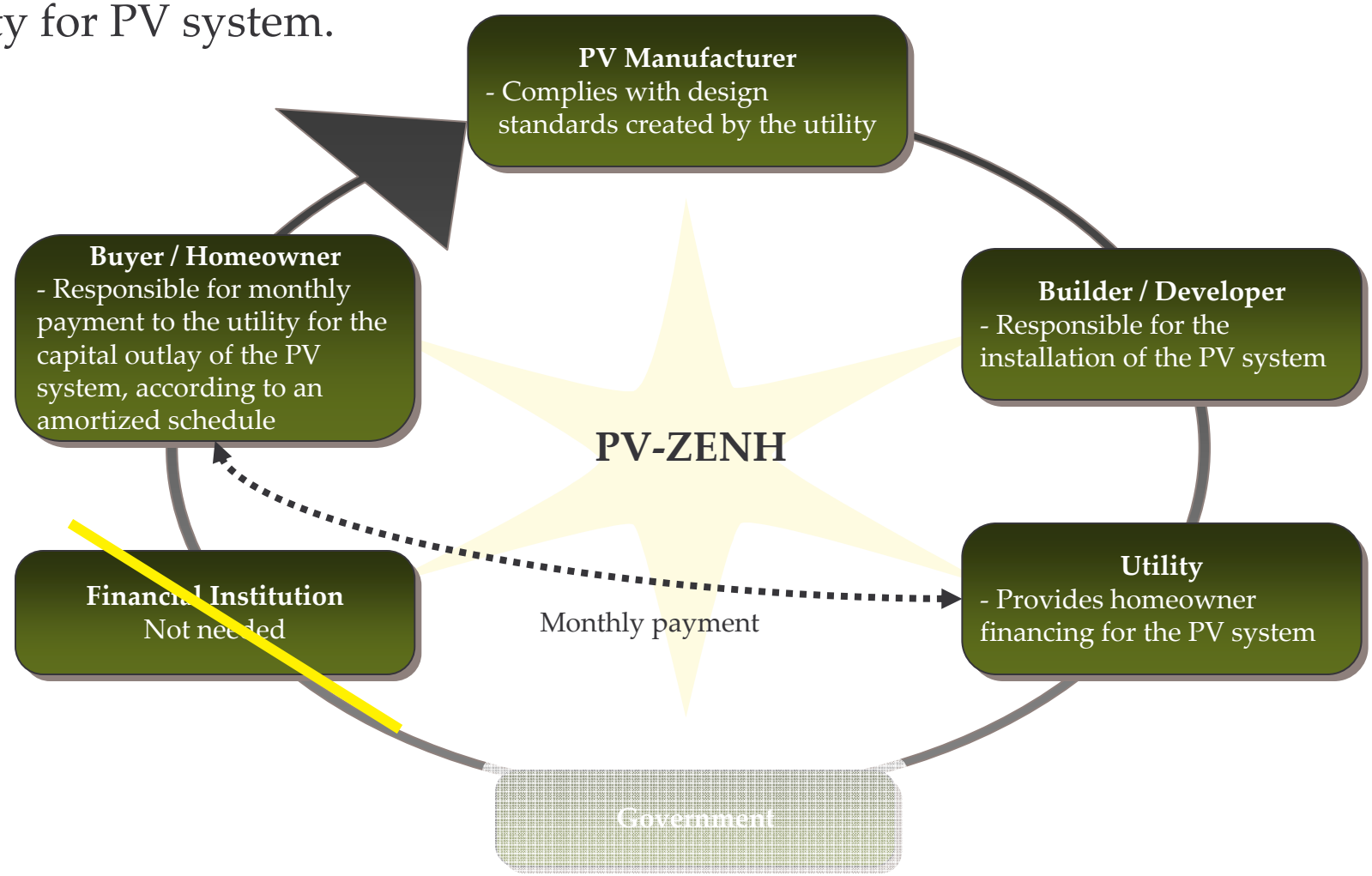
Third Party Aggregator: Sells electricity output or leases PV equipment to homebuyer



PV transaction significantly simplified by having a single third party do it all, including assuming all risks and responsibilities of ownership, operations, maintenance, performance and financing.

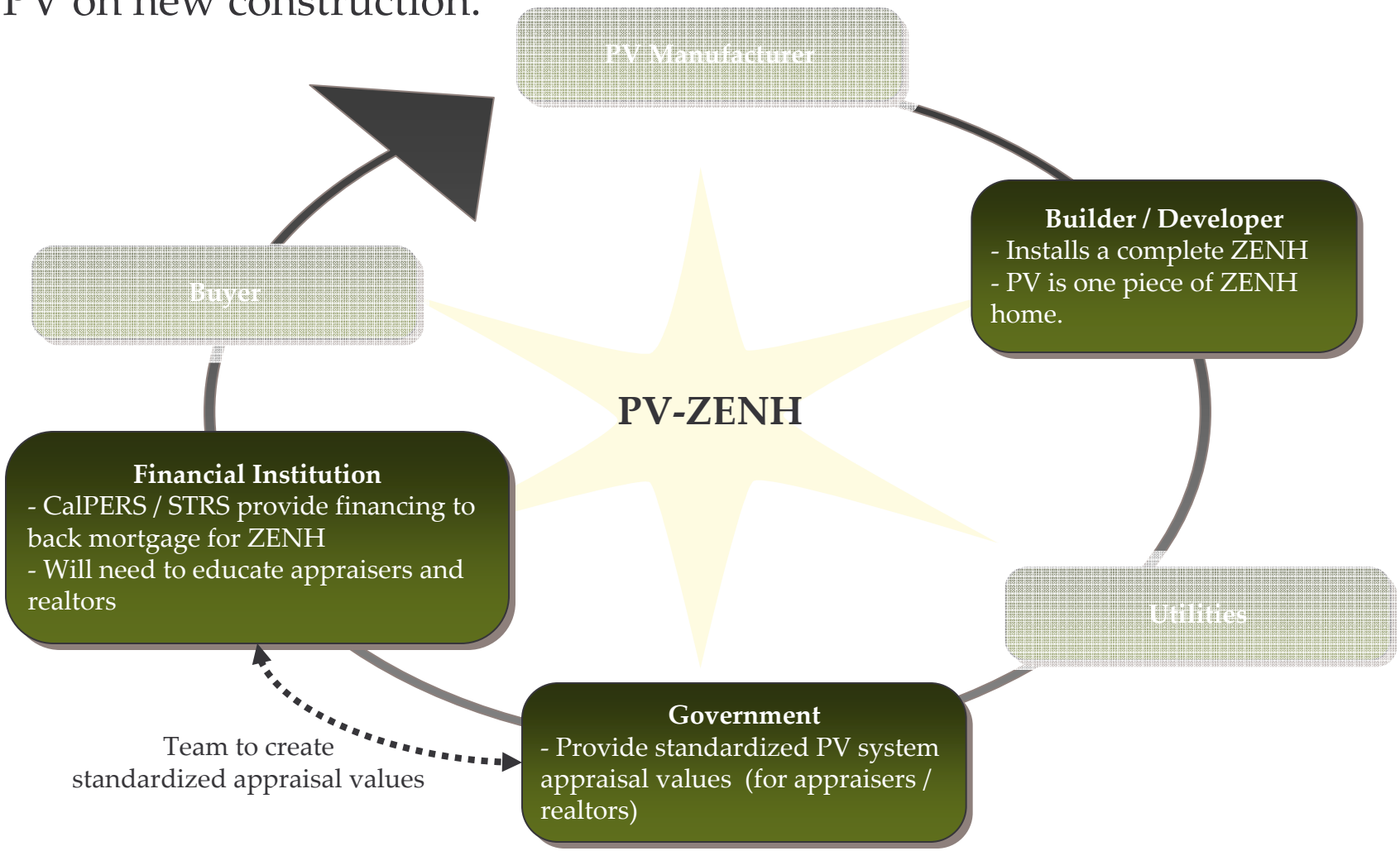
PV-ZENH Workshop Afternoon Breakout
Group: D Business Model # 1

Utility Financed PV System: Homeowner makes monthly payment to utility for PV system.



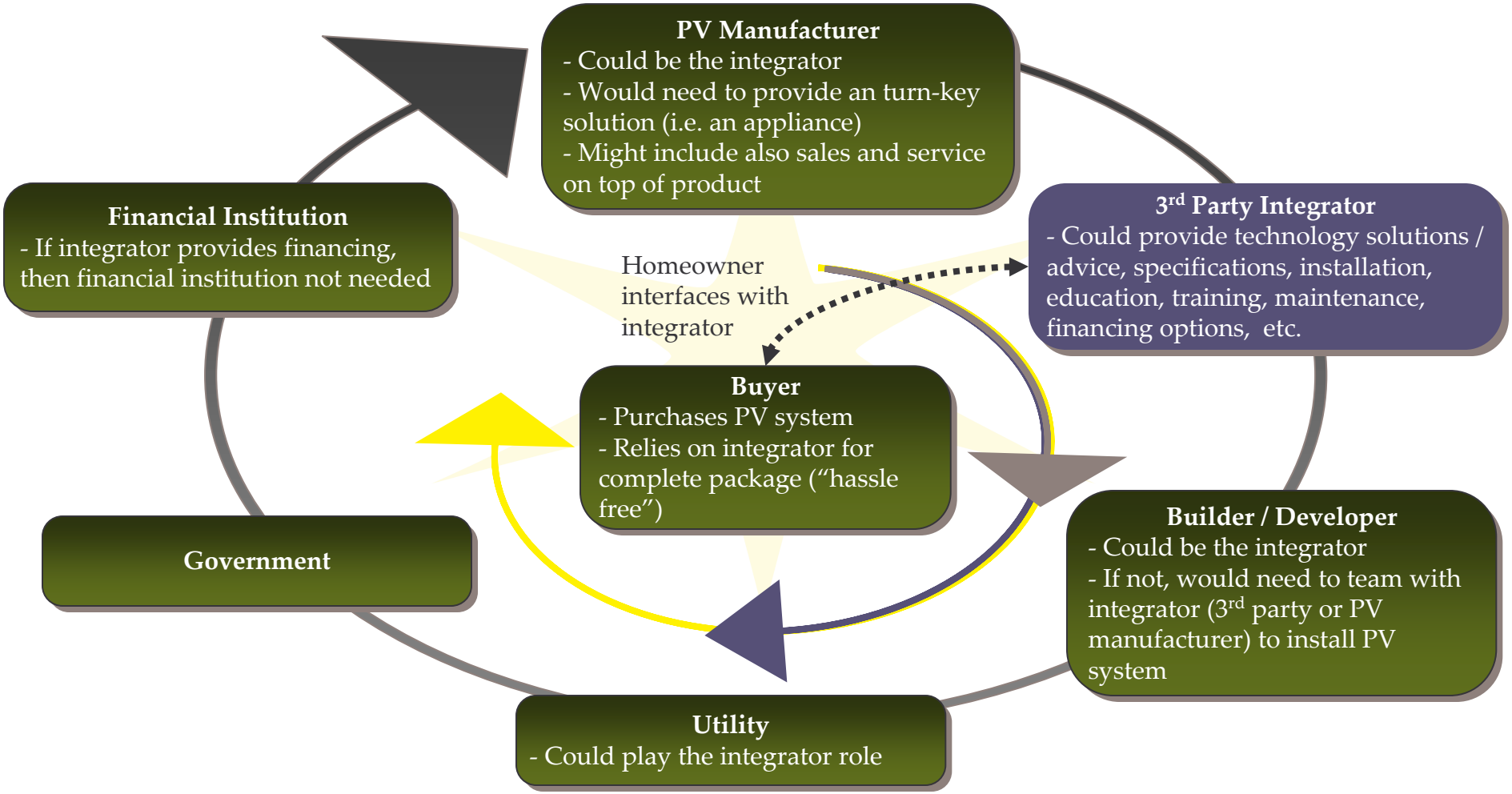
PV-ZENH Workshop Afternoon Breakout
Group: D Business Model # 2

ZENH Mortgage: New mortgage product developed to drive adoption of PV on new construction.



PV-ZENH Workshop Afternoon Breakout
Group: D Business Model # 3

Integrator: One party takes on responsibility for all aspects of PV system installation so that process is hassle-free for homebuyer.



Issue raised by one participant: Will this approach increase the cost to the homeowner?

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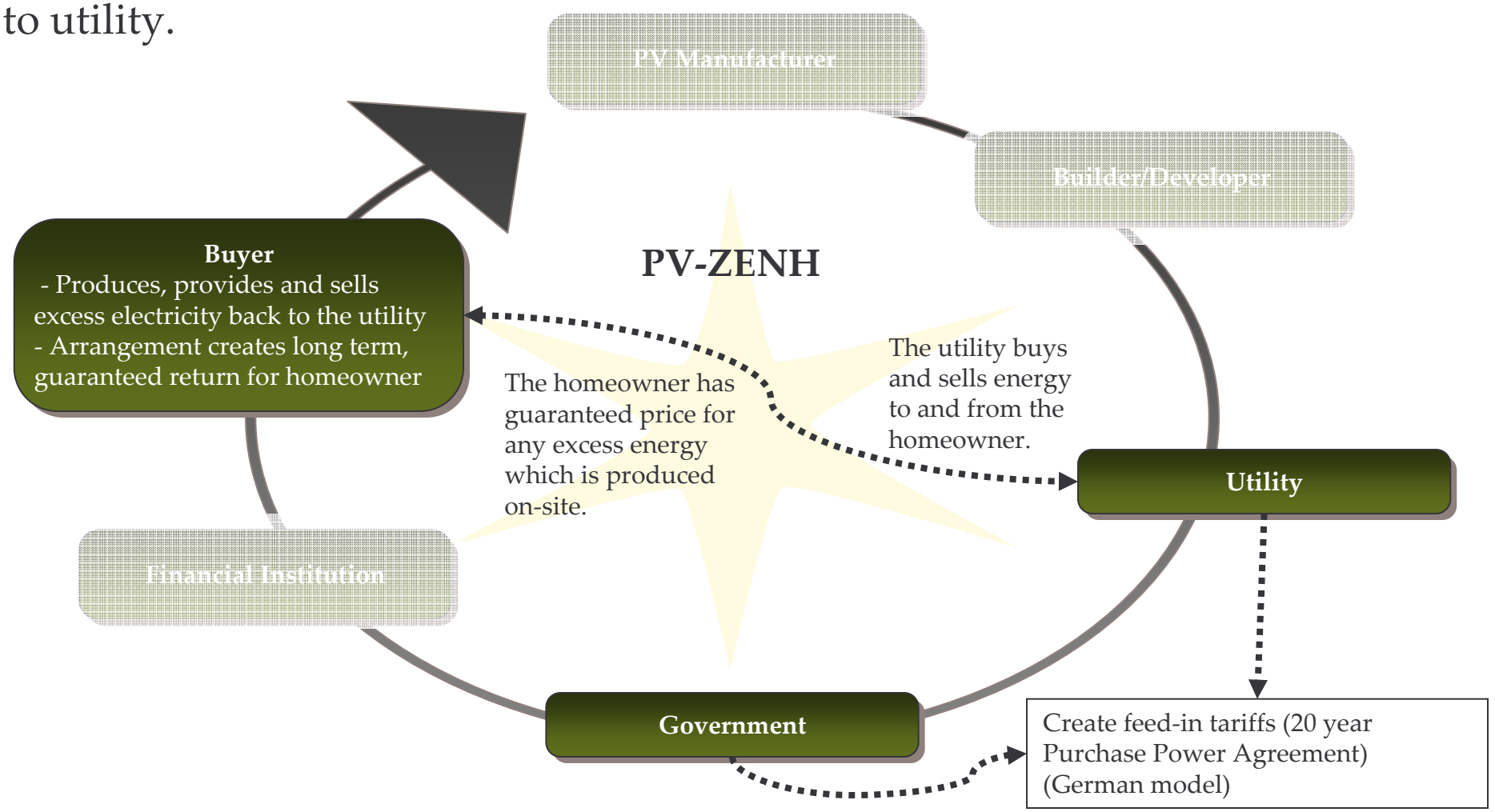
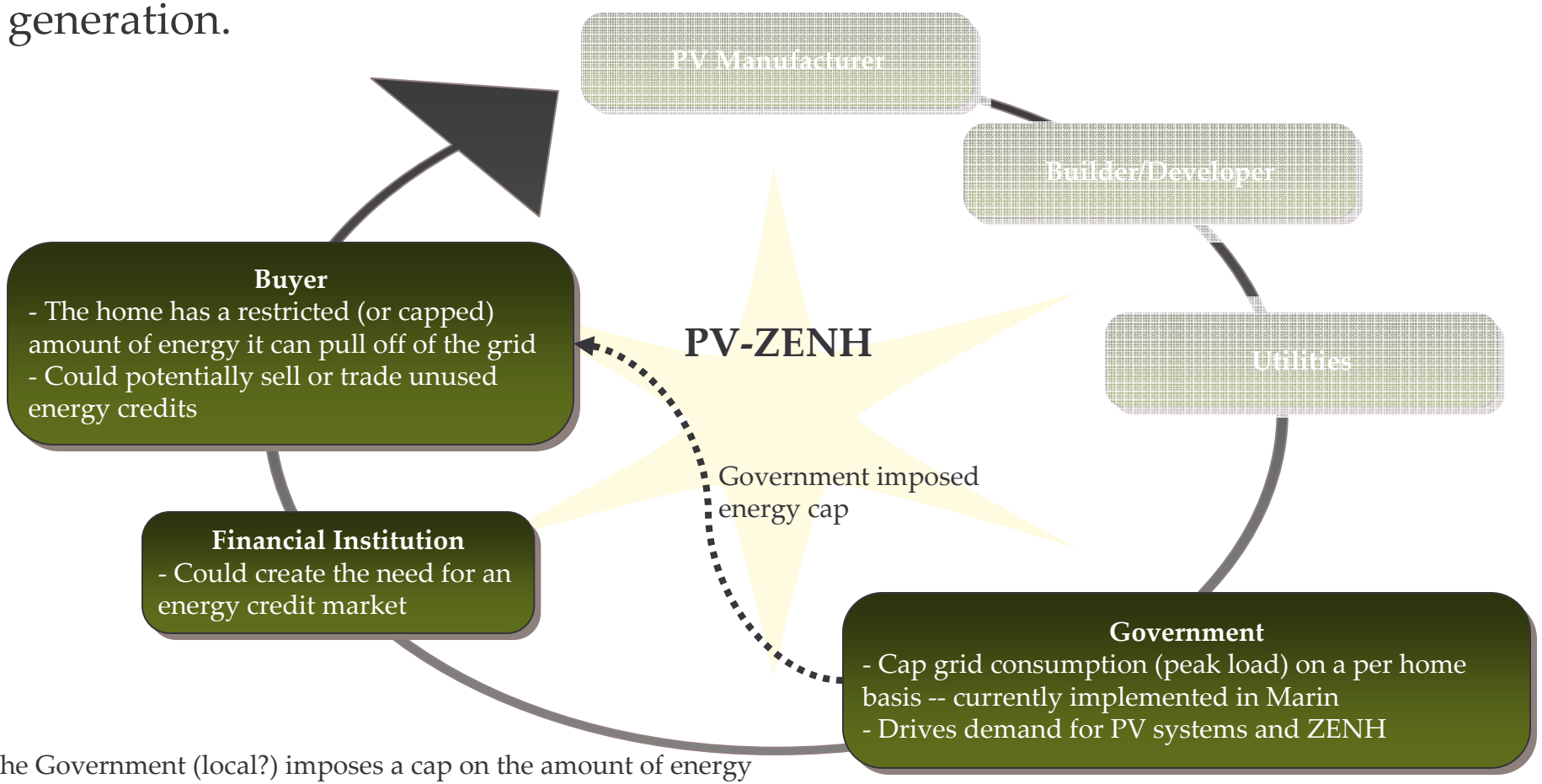
PV-ZENH Workshop Afternoon Breakout
Group: D Business Model # 4

Performance Based Incentives: Homebuyer sells excess electricity back to utility.



PV-ZENH Workshop Afternoon Breakout
Group: D Business Model # 5

Regulatory Energy Cap: Local government limits grid consumption for new homes creating demand for energy efficiency measures and on-site generation.



The Government (local?) imposes a cap on the amount of energy each home can pull from the grid. Any additional demand must be met by on-site production. This drives demand for ZENH and on-site production (i.e. PV systems), and could create the need for an energy credit market.

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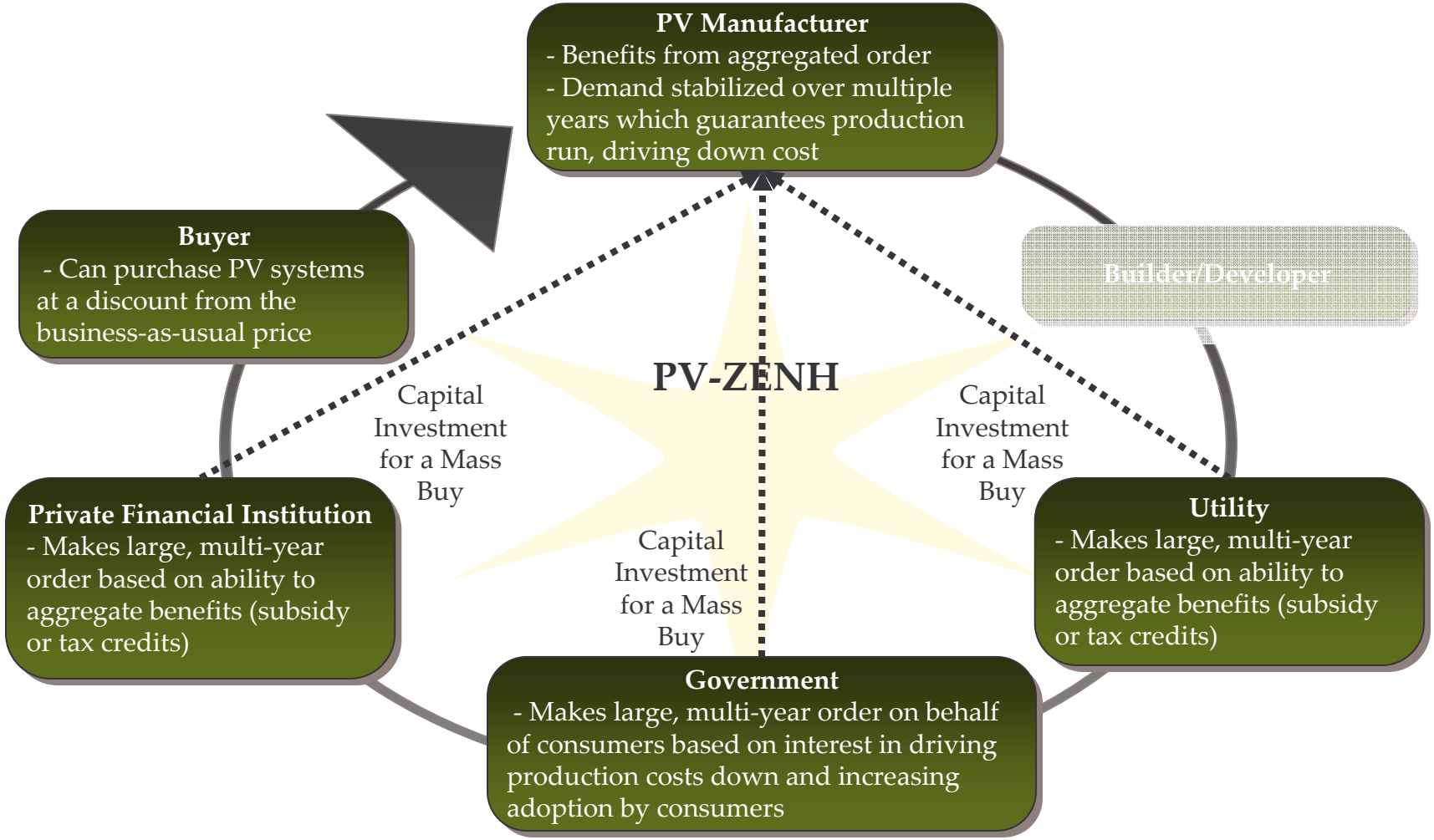
PV-ZENH Workshop Afternoon Breakout
Group: D Business Model # 6

Mass Buy: Aggregate demand and drive down per unit system price.



Either a private institution, governmental group or a utility commits to a large PV order (~$100M+). This stabilizes demand over multiple years which drives down both component and system cost, which in turn increases overall demand for PV systems.

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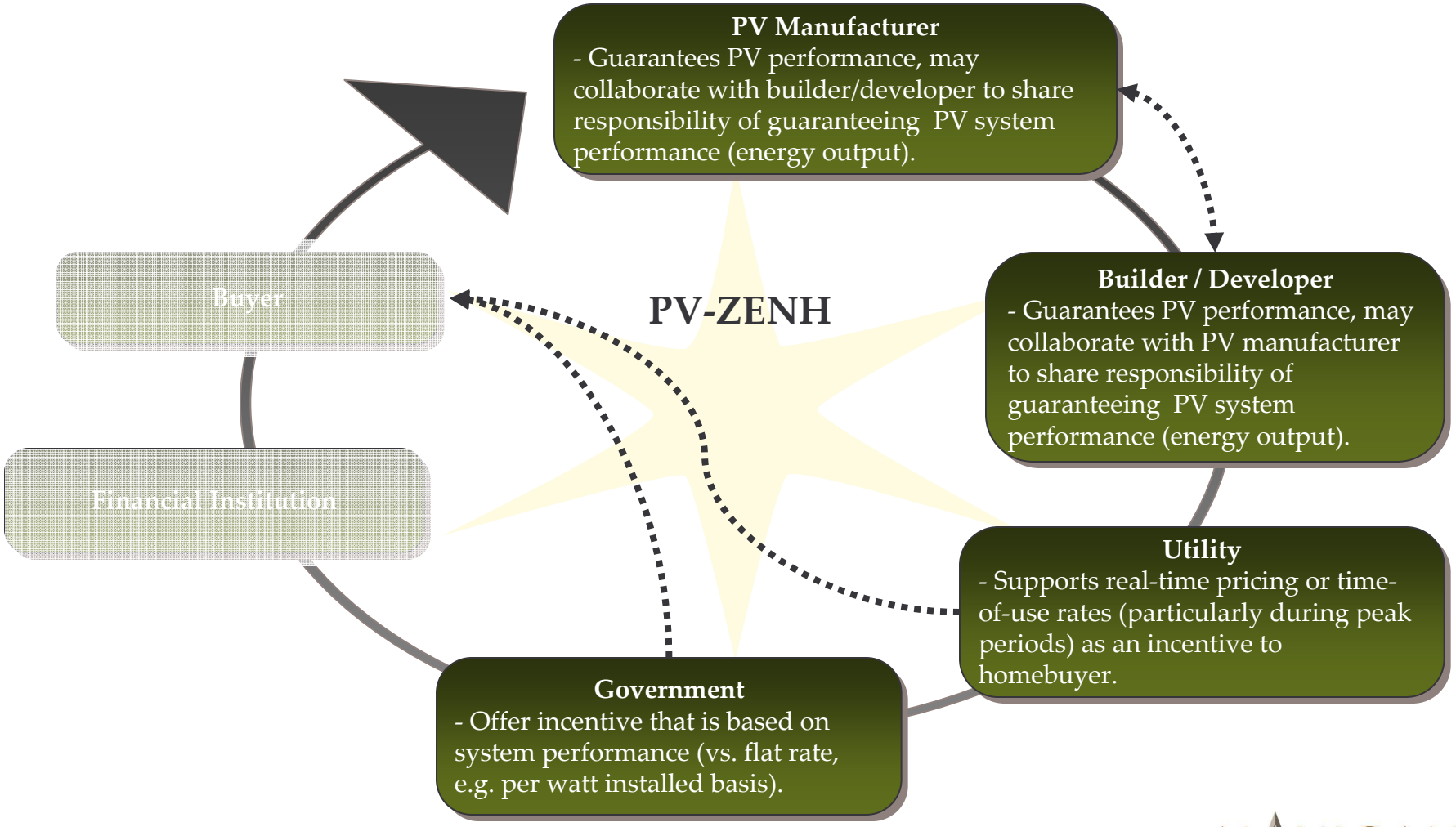
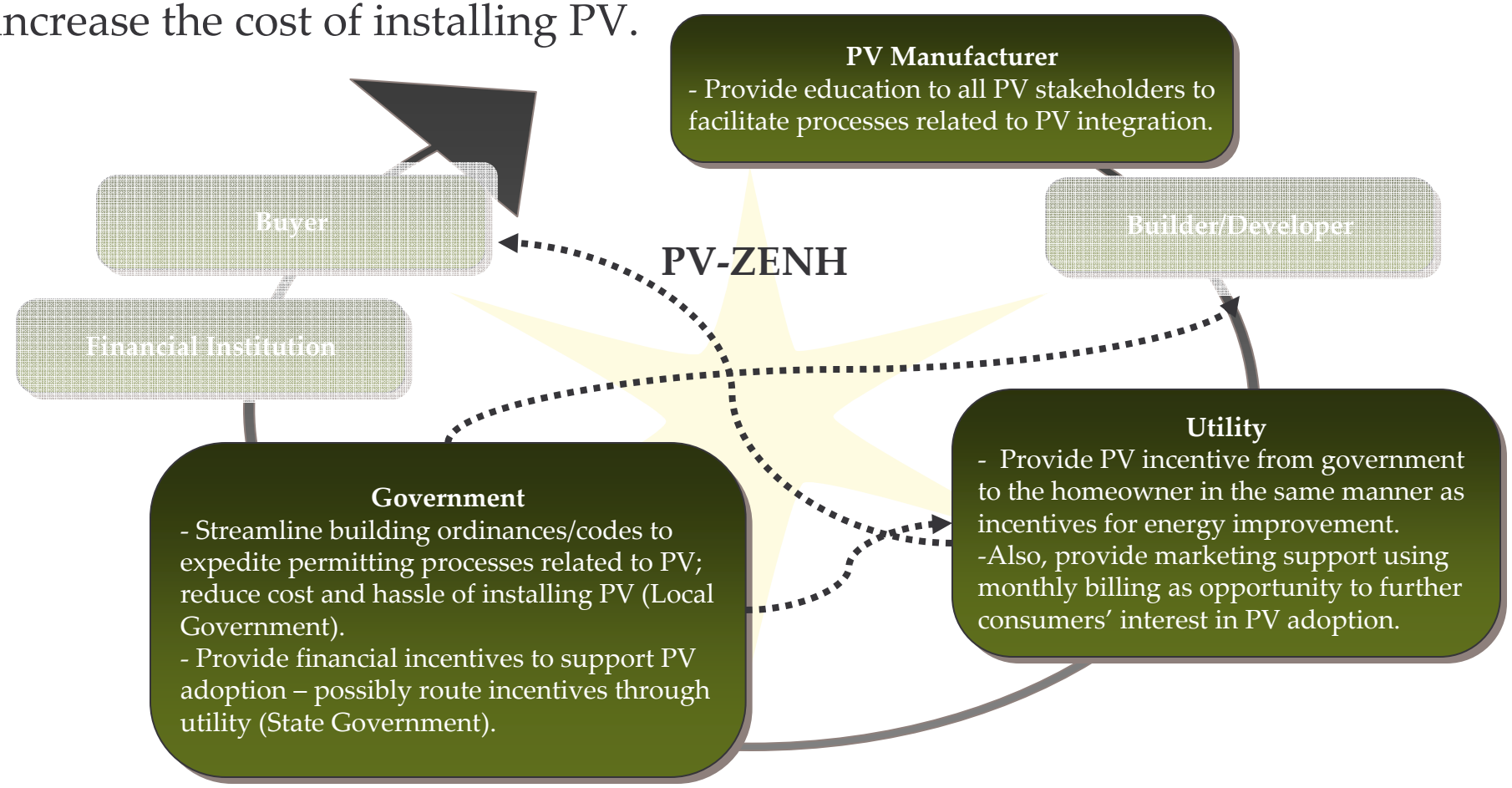
PV-ZENH Workshop Afternoon Breakout
Group: E Business Model # 1

Product Performance: Provide consumer incentive to adopt PV through guaranteed energy production.



PV-ZENH Workshop Afternoon Breakout
Group: E Business Model # 2

Government balanced approach: While offering new home buyers a financial incentive, also reduce or eliminate regulatory controls that increase the cost of installing PV.



Note: In this model, PV marketing by utility and PV manufacture is secondary to the government's two pronged approach. In fact, the marketing elements could stand on their own as separate business model.

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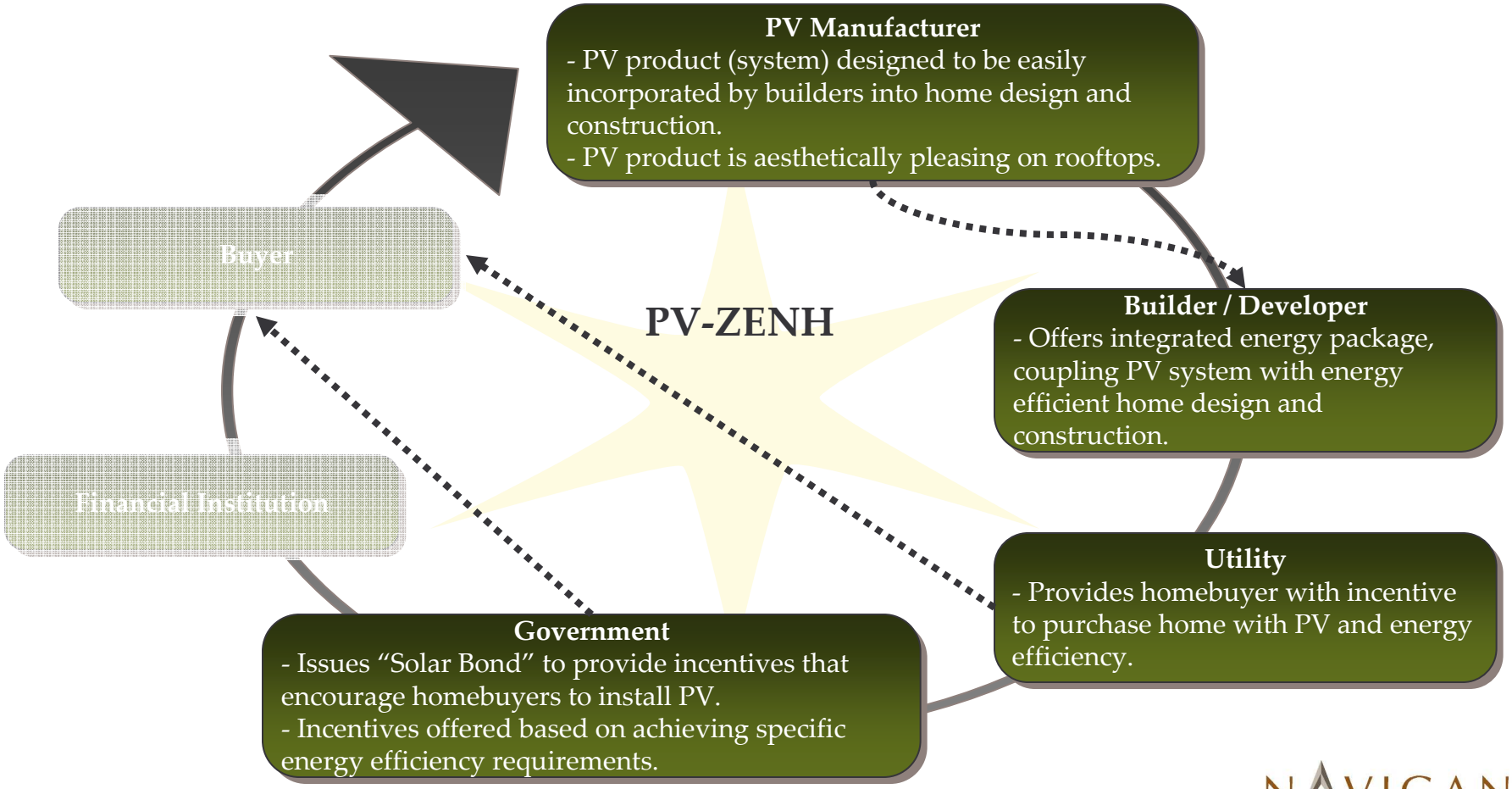
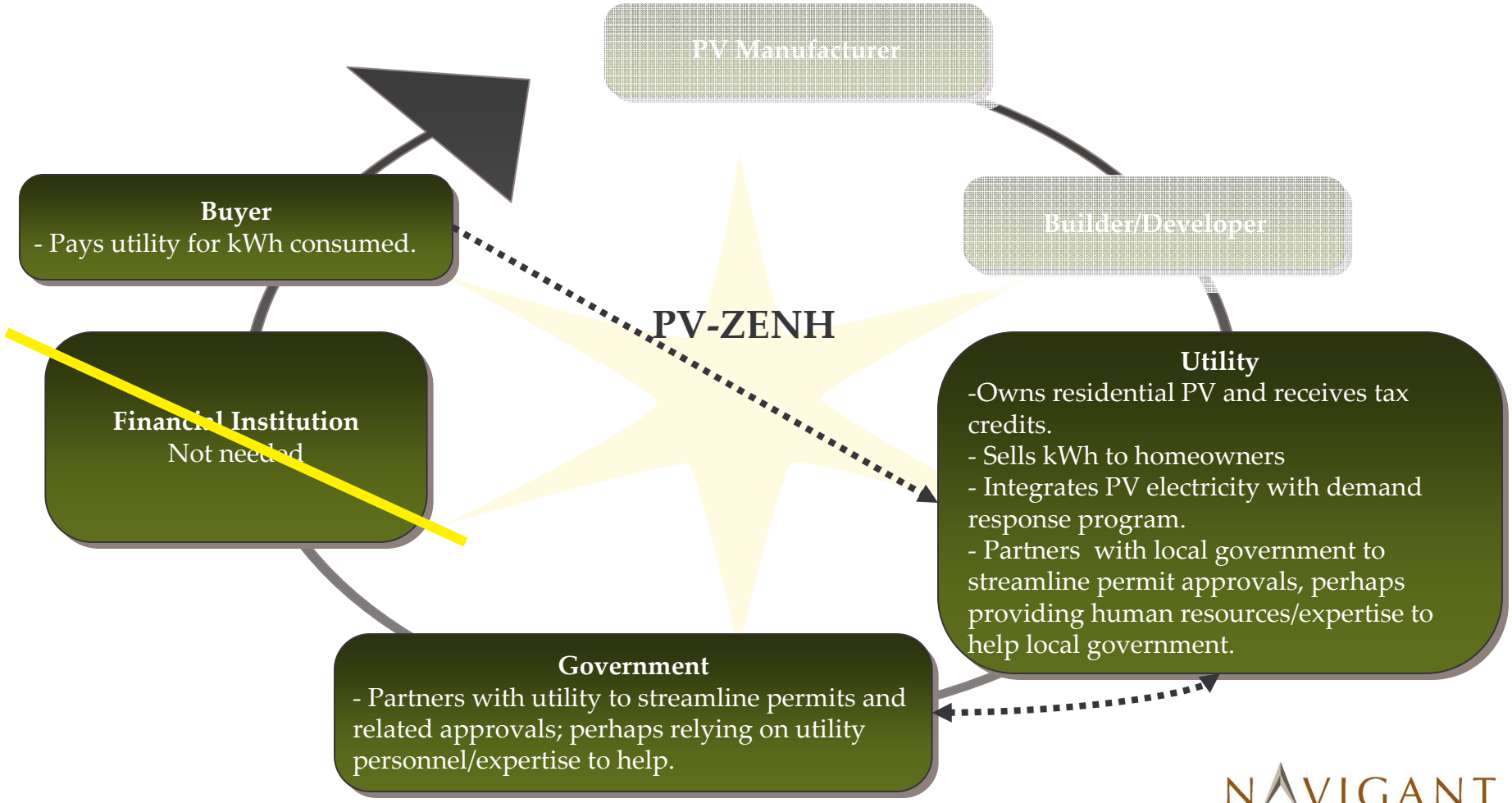
PV-ZENH Workshop Afternoon Breakout
Group: E Business Model # 3

Product Improvement: Offer homebuyer integrated energy package (coupling PV system with energy efficient home design) and insure that PV system is aesthetically pleasing.



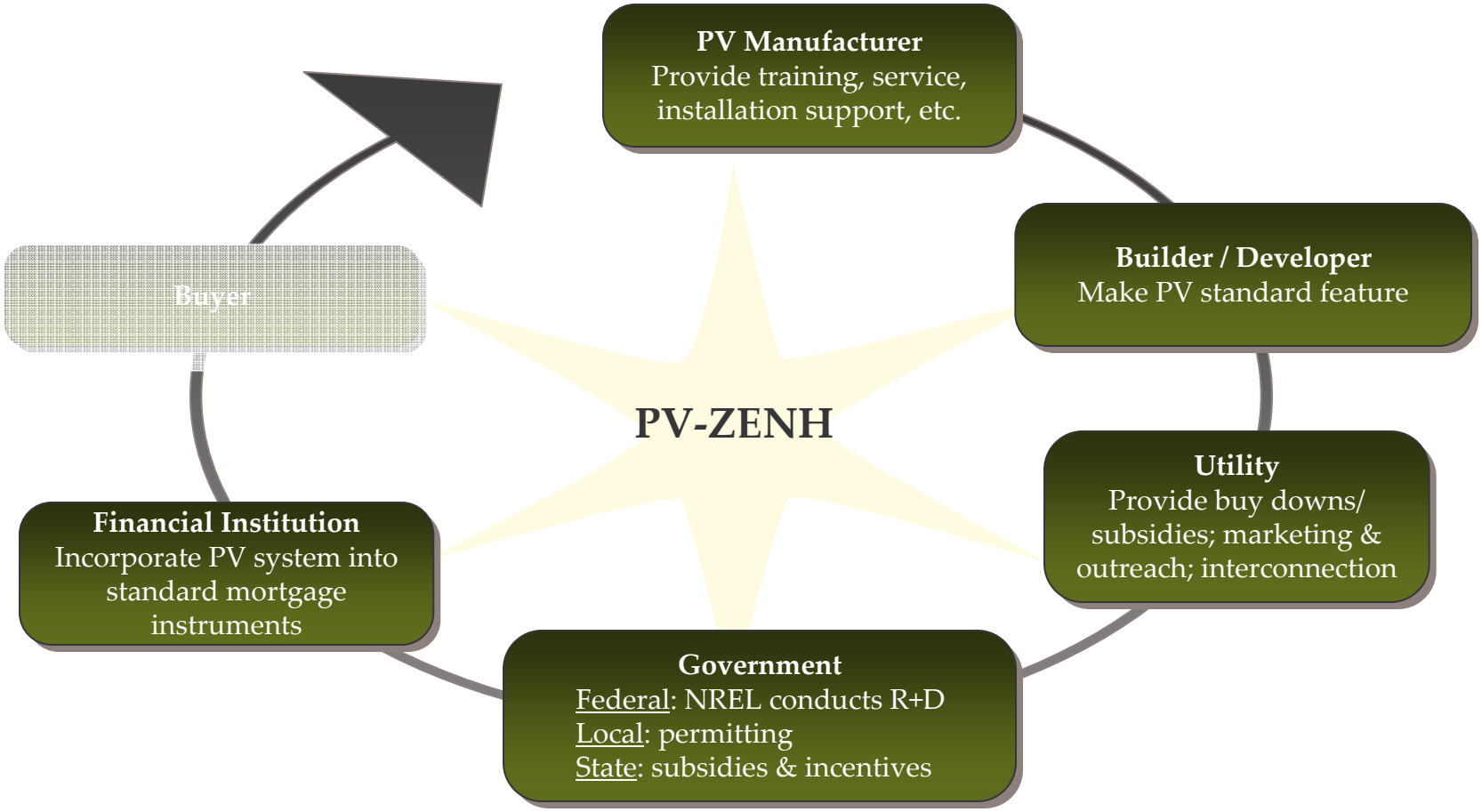
PV-ZENH Workshop Afternoon Breakout
Group: E Business Model # 4

Utility-Focused: Utility owns PV system on homebuyer's roof and sells electricity to homebuyer at predetermined rate.



PV-ZENH Workshop Afternoon Breakout
Group: F Business Model # 1

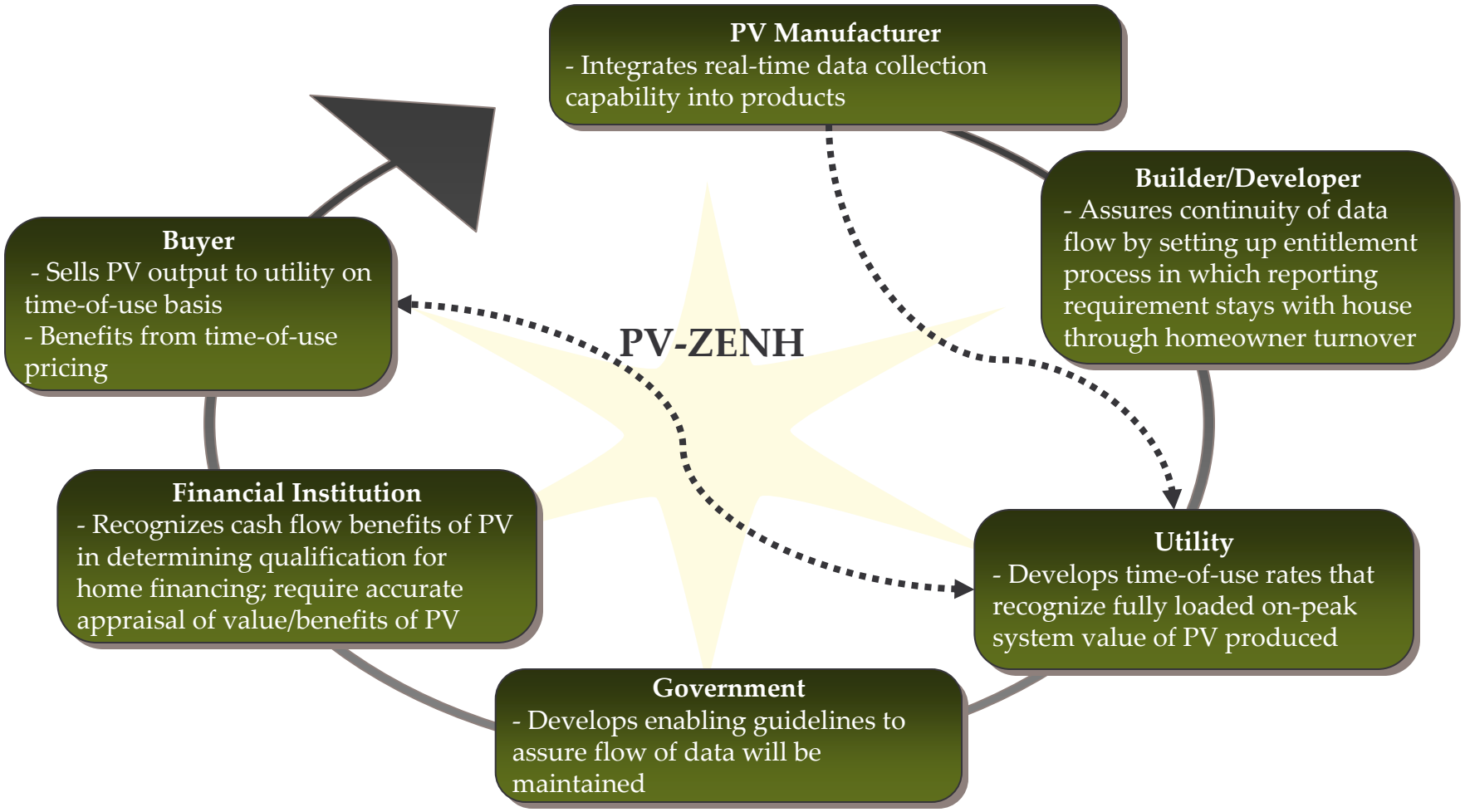
Apply Existing DOE ZEH Model to California



Public/private partnerships facilitated by DOE to promote development of zero energy subdivisions. This is an existing DOE program that could be accessed by anyone today.

PV-ZENH Workshop Afternoon Breakout
Group: F Business Model # 2

Data Drives Change: Recognize the value of pooling PV data



By establishing both the system benefits and value of residential PV systems, this model can serve to establish a more sustainable PV industry through integrating fully with utility grid operations.

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